BSDMS Summary Report

27 Pearl River at eastbound S.R. 25 at Jackson, MS

Site Location:

Site ID: 27

Site Name: Pearl River at eastbound S.R. 25 at Jackson, MS

County: Hinds

Nearest City: Jackson

State: MS

Latitude: 321956

Longitude: 900742

USGS Station ID: 2485735

Route Number: 25

Route Class: State

Service Level: Alternate

Route Direction: East

Highway Mile Point: 1.7

Stream Name: Pearl River

River Mile:

Contact:
U.S. Geological Survey, WRD, MS. District
100 W. Capitol Street, Suite 710
Jackson, MS. 39269

Publication:

Site Description:

This is an 1,140-ft-long bridge crossing the Pearl River at Jackson at river mile 292.5. At this crossing, State Highway 25 is also known as Lakeland Drive. This entry is for the eastbound lanes, which are downstream from the westbound lanes. The bridge has a span arrangement of 15 at 40 ft, 1 at 90 ft, 1 at 120 ft, 1 at 90 ft, and 6 at 40 ft from right to left (west to east). The 40-ft spans are supported by single-pile bents (2R-15R & 20R-24R), the 90-ft spans are supported by a double-pile bent (16R & 19R) and a main pier (17R & 18R), and the 120-ft span is supported by two main piers (17R & 18R). The main piers consist of two 3.5-ft-diameter columns on a pile-supported footing. The pile bents consist of 16x16-in piles. The bridge is 88 ft downstream from the upstream side of the westbound-lane bridge.

Scour data were collected during high and low flows using a fathometer. The flow velocities approaching the bridge piers were determined from velocity soundings during discharge measurements obtained at the upstream side of the upstream bridge, about 88 ft upstream. Ground-pentrating radar was also used at the site in July 1992 to detect infilling of scour holes.

On April 28, 1993, bed samples were collected from the main channel at selected intervals along three channel cross sections. Individual samples with similiar characteristics were combined for gradation analyses. The following is a brief description of the bed samples collected:

BSDMS Summary Report

27 Pearl River at eastbound S.R. 25 at Jackson, MS

Cross Section	Distance Upstream	Sample	Comments
1	100 ft	1	Bed at about mid-span between bents 16-17L.
1	100 ft	2	Bed in vicinity of main piers 17-18L.
2	500 ft	3	Mid-channel.
2	500 ft	4	Left part channel.
3	900 ft	5	Mid-to-left part of channel.

The right part of the channel bed at cross sections 2 & 3 seems to be mostly silty clay. Bed sample no.1 was used for bents 14-16R and sample no.2 was used for main piers 17-18R. For pile bent 12-13R, the material is a clay with a cohesion of about 240 lb/ft2 and an angle of internal friction of about 27 degrees, as determined from shear-strength tests on Sept.20, 1991.

Elevation Reference

Datum: MSL

MSL (ft):

Description of Reference Elevation:

RP-3.-- Chiseled square on top of light-pole base on upstream side of upstream bridge near right (east) edge of channel (Elev. 289.41 ft).
RP-4.-- Chiseled square on top of upstream handrail near RP-3 on upstream side of upstream bridge (Elev. 291.18 ft).

Stream Data

Drainage Area (sq mi):	3130	**Floodplain Width:**	Wide
Slope in Vicinity(ft/ft):	0.00019	**Natural Levees:**	Both
Flow Impact:	Right	**Apparent Incision:**	None
Channel Evolution	Premodified	**Channel Boundary:**	Alluvial
Armoring:	None	**Banks Tree Cover:**	Low
Debris Frequency:	Occasional	**Sinuosity:**	Meandering
Debris Effect:	Local	**Braiding:**	None
Stream Size:	Medium	**Anabranching:**	None
Flow Habit:	Perennial	**Bars:**	Narrow
Bed Material:	Sand	**Stream Width Variability:**	Wider
Valley Setting:	Moderate		

BSDMS Summary Report

27 Pearl River at eastbound S.R. 25 at Jackson, MS

Roughness Data

Manning's n Values

	Left Overbank	Channel	Right Overbank
High:			
Typical	0.16	0.038	0.12
Low:			

Bed Material

Measurement Number	Yr	Mo	Dy	Sampler	D95 (mm)	D84 (mm)	D50 (mm)	D16 (mm)	SP	Shape	Cohesion
1	1993	4	28	BMH-60	2.9	1.2	0.54	0.36	2.65		Non-Cohesive
2	1993	4	28	SCOOP	1.3	0.9	0.39	0.26	2.65		Non-Cohesive
3	1993	4	28	BMH-60	9.5	5.5	0.39	0.26	2.65		Non-Cohesive
4	1993	4	28	BMH-60	1.7	1.3	0.64	0.35	2.65		Non-Cohesive
5	1993	4	28	BMH-60	1	0.4	0.29	0.18	2.65		Non-Cohesive

Bed Material Comments

Measurement No: 1

On April 28, 1993, bed samples were collected from the main channel at selected intervals along three channel cross sections. Individual samples with similiar characteristics were combined for gradation analyses. The following is a brief description of the bed samples collected :

Cross Section	Distance Upstream	Sample	Comments
1	100 ft	1	Bed at about mid-span between bents 16-17L.
1	100 ft	2	Bed in vicinity of main piers 17-18L.
2	500 ft	3	Mid-channel.
2	500 ft	4	Left part channel.
3	900 ft	5	Mid-to-left part of channel.

The right part of the channel bed at cross sections 2 & 3 seems to be mostly silty clay. Bed sample no.1 was used for bents 14-16R and sample no.2 was used for main piers 17-18R. For pile bent 12-13R, the material is a clay with a cohesion of about 240 lb/ft2 and an angle of internal friction of about 27 degrees, as determined from shear-strength tests on Sept.20, 1991.

Measurement No: 2

On April 28, 1993, bed samples were collected from the main channel at selected intervals along three channel cross sections. Individual samples with similiar characteristics were combined for gradation analyses. The following is a brief description of the bed samples collected :

Cross Section	Distance Upstream	Sample	Comments
1	100 ft	1	Bed at about mid-span between bents 16-17L.
1	100 ft	2	Bed in vicinity of main piers 17-18L.
2	500 ft	3	Mid-channel.
2	500 ft	4	Left part channel.
3	900 ft	5	Mid-to-left part of channel.

The right part of the channel bed at cross sections 2 & 3 seems to be mostly silty clay. Bed sample no.1 was used for bents 14-16R and sample no.2 was used for main piers 17-18R. For pile bent 12-13R, the material is a clay with a cohesion of about 240 lb/ft2 and an angle of internal friction of about 27 degrees, as determined from shear-strength tests on Sept.20, 1991.

Measurement No: 3

On April 28, 1993, bed samples were collected from the main channel at selected intervals along three channel cross sections. Individual samples with similiar characteristics were combined for gradation analyses. The following is a brief description of the bed samples collected :

Cross Section	Distance Upstream	Sample	Comments
1	100 ft	1	Bed at about mid-span between bents 16-17L.
1	100 ft	2	Bed in vicinity of main piers 17-18L.
2	500 ft	3	Mid-channel.
2	500 ft	4	Left part channel.
3	900 ft	5	Mid-to-left part of channel.

The right part of the channel bed at cross sections 2 & 3 seems to be mostly silty clay. Bed sample no.1 was used for bents 14-16R and sample no.2 was used for main piers 17-18R. For pile bent 12-13R, the material is a clay with a cohesion of about 240 lb/ft2 and an angle of internal friction of about 27 degrees, as determined from shear-strength tests on Sept.20, 1991.

Measurement No: 4

On April 28, 1993, bed samples were collected from the main channel at selected intervals along three channel cross sections. Individual samples with similiar characteristics were combined for gradation analyses. The following is a brief description of the bed samples collected :

Cross Section	Distance Upstream	Sample	Comments
1	100 ft	1	Bed at about mid-span between bents 16-17L.
1	100 ft	2	Bed in vicinity of main piers 17-18L.
2	500 ft	3	Mid-channel.
2	500 ft	4	Left part channel.
3	900 ft	5	Mid-to-left part of channel.

The right part of the channel bed at cross sections 2 & 3 seems to be mostly silty clay. Bed sample no.1 was used for bents 14-16R and sample no.2 was used for main piers 17-18R. For pile bent 12-13R, the material is a clay with a cohesion of about 240 lb/ft2 and an angle of internal friction of about 27 degrees, as determined from shear-strength tests on Sept.20, 1991.

BSDMS Summary Report

27 Pearl River at eastbound S.R. 25 at Jackson, MS

Measurement No: 5

On April 28, 1993, bed samples were collected from the main channel at selected intervals along three channel cross sections. Individual samples with similiar characteristics were combined for gradation analyses. The following is a brief description of the bed samples collected :

Cross Section	Distance Upstream	Sample	Comments
1	100 ft	1	Bed at about mid-span between bents 16-17L.
1	100 ft	2	Bed in vicinity of main piers 17-18L.
2	500 ft	3	Mid-channel.
2	500 ft	4	Left part channel.
3	900 ft	5	Mid-to-left part of channel.

The right part of the channel bed at cross sections 2 & 3 seems to be mostly silty clay. Bed sample no.1 was used for bents 14-16R and sample no.2 was used for main piers 17-18R. For pile bent 12-13R, the material is a clay with a cohesion of about 240 lb/ft2 and an angle of internal friction of about 27 degrees, as determined from shear-strength tests on Sept.20, 1991.

Bridge Data

Structure No: 1.7B

Length(ft): 1140

Width(ft): 32

Number of Spans: 21

Vertical Configuration: Curvilinear

Low Chord Elev (ft): 282

Upper Chord Elev (ft): 285.2

Overtopping Elev (ft): 283.7

Skew (degrees): 25

Guide Banks: None

Waterway Classification: Main

Year Built: 1966

Avg Daily Traffic: 16440

Plans on File: Yes

Parallel Bridges Yes

Upstream/Downstream: Downstream

Continuous Abutment: No

Distance Between Centerlines: 88

Distance Between Pier Faces: 59

Bridge Description:
Number of spans is actually 24.

Abutment Data

Left Station: 0

Right Station: 0

Left Skew (deg): 0

Right Skew (deg) 0

Left Abutment Length (ft): 0

Right Abutment Length (ft) 0

Left Abutment to Channel Bank (ft):

Right Abutment to Channel Bank (ft):

Left Abutment Protection:

Right Abutment Protection

Contracted Opening Type: Unknown

Embankment Skew (deg): 0

Embankment Slope (ft/ft):

Abutment Slope (ft/ft)

Wingwalls: No

Wingwall Angle (deg): 0

Pier Data

Pier ID	Bridge Station(ft)	Alignment	Highway Station	PierType	# Of Piles	Pile Spacing(ft)
12R	9990	0	9990	Group	5	6.25
13R	10030	0	10030	Group	5	6.25
14R	10070	0	10070	Group	5	6.25

15R	10110	0	10110	Group	5	6.25
16R	10150	0	10150	Group	9	
17R	10240	0	10240	Group	2	17
18R	10360	0	10360	Group	2	17
19R	10450	0	10450	Group	9	

Pier ID	Pier Width(ft)	Pier Shape	Shape Factor	Length(ft)	Protection	Foundation
12R	1.33	Square		26.3	None	Piles
13R	1.33	Square		26.3	None	Piles
14R	1.33	Square		26.3	None	Piles
15R	1.33	Square		26.3	None	Piles
16R	2.67	Square		26.3	None	Piles
17R	3.5	ylindrica		20.5	None	Poured
18R	3.5	ylindrica		20.5	Unknown	Poured
19R	2.67	Square		26.3	None	Piles

Pier ID	Top Elevation(ft)	Bottom Elevation(ft)	Foot or Pile Cap Width(ft)	Cap Shape	Pile Tip Elevation(ft)
12R				Unknown	218
13R				Unknown	219
14R				Unknown	219
15R				Unknown	219
16R				Unknown	214
17R	255.7	251.2	11	Unknown	215
18R	255.6	251.1	11	Unknown	215
19R				Unknown	214

Pier Description

Pier ID 12R

Pier consists of one row of five 16x16-inch concrete piles spaced 6.25 ft apart.

Pier ID 13R

Pier consists of one row of five 16x16-inch concrete piles spaced 6.25 ft apart.

Pier ID 14R

Pier consists of one row of five 16x16-inch concrete piles spaced 6.25 ft apart.

Pier ID 15R

Pier consists of one row of five 16x16-inch concrete piles spaced 6.25 ft apart.

Pier ID 16R

The pier has two rows of 16x16-inch concrete piles battered at 1 into 1 ft. One row has five piles spaced 6.25 ft apart, and the other row has four piles spaced 8.33 ft apart. At top of piles (elev.279.2), rows are spaced 2.0 ft apart. Bottom of cap is at elev. 278.1 ft.

Pier ID 17R

The pier has two 3.5-ft-diameter concrete columns spaced 17 ft apart. Columns have 11-ft-wide by 10-ft-long by 4.5-ft-deep concrete footings (with 3.5-ft-wide connecting webs) supported by eight 18-in concrete piles. There are three piles at the us side of the footing, two in middle, and three at the ds side.

Pier ID 18R

The pier has two 3.5-ft-diameter concrete columns spaced 17 ft apart. Columns have 11-ft-wide by 10-ft-long by 4.5-ft-deep concrete footings (with 3.5-ft-wide connecting webs) supported by eight 18-in concrete piles. There are three piles at the us side of the footing, two in middle, and three at the ds side.

Pier ID 19R

Pier consist of two rows of 16x16-inch concrete piles battered at 1 into 1 ft. One row has five piles spaced 6.25 ft apart, and the other row has four piles spaced 8.33 ft apart. At top of piles (elev.279.2), rows are spaced 2.0 ft apart. Bottom of cap is at elev. 278.1 ft.

Pier Scour Data

Pier ID	Date	Time	USOrDS
15R	5/1/91	11:20	Upstream
16R	2/25/91	15:20	Upstream
16R	5/1/91	11:20	Downstream
17R	2/25/91	15:20	Upstream
17R	5/1/91	11:20	Upstream
18R	2/25/91	15:20	Upstream
18R	5/1/91	11:20	Upstream

Pier ID	Scour Depth	Accuracy (ft)	Side Slope (ft/ft)	TopWidth (ft)	Apprch Vel (ft/s)	Apprch Depth(ft)	Effective Pier Width	Skew to Flow(deg)
15R	1.4	0.5	5.9	20	5.1	30.6	1.33	16
16R	2.9	0.5	2.8	19	3.9	27.5	2.67	16
16R	2.1	0.5	3.9	26	4.7	26.6	2.67	11
17R	1.6	0.5	6.4	27	2.8	23.3	5.5	16
17R	3.9	0.5	2.2	28	3.2	21.7	4.8	8
18R	5.7	0.5	2.3	31	2.4	20.2	5.1	20
18R	3.7	0.5	3.2	26	2	23	5.1	14

PierID	Sediment Transport	Bed Material	BedForm	Trough (ft)	Crest (ft)	Sigma	Debris Effects
15R	Live-bed	Non-cohesive	Unknown			1.8	Insignificant
16R	Live-bed	Non-cohesive	Unknown			1.8	Insignificant
16R	Live-bed	Non-cohesive	Unknown			1.8	Insignificant
17R	Live-bed	Non-cohesive	Unknown			1.9	Insignificant
17R	Live-bed	Non-cohesive	Unknown			1.9	Insignificant

18R	Live-bed	Non-cohesive	Unknown	1.9	Insignificant
18R	Live-bed	Non-cohesive	Unknown	1.9	Insignificant

PierID	D95 (mm)	D84 (mm)	D50 (mm)	D16 (mm)
15R	2.9	1.2	0.54	0.36
16R	2.9	1.2	0.54	0.36
16R	2.9	1.2	0.54	0.36
17R	1.3	0.9	0.39	0.26
17R	1.3	0.9	0.39	0.26
18R	1.3	0.9	0.39	0.26
18R	1.3	0.9	0.39	0.26

Pier Scour Comments

Pier ID 15R **Time:** 11:20 **US/DS:** Upstream

Reference bed is at elev. 243.0 ft.
Minimum bed elev. at the pier is at the upstream side at 241.6 ft.
Scour-depth = 243.0 - 241.6 = 1.4 ft.

Pier ID 16R **Time:** 15:20 **US/DS:** Upstream

Reference bed is at elev. 243.9 ft.
Minimum bed elev. at the pier is at the upstream side at 241.0 ft.
Scour-hole depth = 243.9 - 241.0 = 2.9 ft.

Pier ID 16R **Time:** 11:20 **US/DS:** Downstream

Reference bed is at elev. 247.0 ft.
Minimum bed elev. at the pier is at the downstream side at 244.9 ft.
Scour-hole depth = 247.0 - 244.9 = 2.1 ft.

Pier ID 17R **Time:** 15:20 **US/DS:** Upstream

Reference bed is at elev. 248.1 ft. Minimum bed elev. at pier is at upstream side at 246.5 ft. Scour-hole depth = 248.1 - 246.5 = 1.6 ft.
Effective pier width is a depth-weighted average of column, footing, and piling widths.

Pier ID 17R **Time:** 11:20 **US/DS:** Upstream

Reference bed is at elev. 251.9 ft.
Minimum bed elev. at the pier is at the upstream side at 248.0 ft.
Scour-hole depth = 251.9 - 248.0 = 3.9 ft.
Eff. pier width is a depth-weighted ave. of column, footing, and piling.

BSDMS Summary Report

27 Pearl River at eastbound S.R. 25 at Jackson, MS

Pier ID 18R **Time:** 15:20 **US/DS:** Upstream

Reference bed is at elev. 251.2 ft.
Minimum bed elev. at pier at upstream side is at 245.5 ft.
Scour-hole depth = 251.2 - 245.5 = 5.7 ft.
Eff. pier width is a depth-weighted ave. of column, footing, and piling width.

Pier ID 18R **Time:** 11:20 **US/DS:** Upstream

Reference bed is at elev. 250.6 ft. ft.
Minimum bed elev. at pier is at upstream side is at 246.9 ft.
Scour-hole depth = 250.6 - 246.9 = 3.7 ft.
Eff. pier width is a depth-weighted ave. of column, footing, and piling width.

Abutment Scour

ContractionScour

Stage and Discharge Data

Peak Discharge					Flow		Peak Stage					Stage	Water	Return
year	mo	dy	hr	mi	(cfs)	Qacc	year	mo	dy	hr	mi	(ft)	Temp (C)	Period(yr)
1991	5	1	11:10	10	49800	5	1991	5	1	11:10	10	273.6		7
1991	2	25	15:00	0	36800	5	1991	2	25	1:50	0	271.42		3

BSDMS Summary Report

27 Pearl River at eastbound S.R. 25 at Jackson, MS

0		none	1990	1	31	15:00	0	267
0		none	1991	9	20		0	250.8
0		none	1990	9	20		0	250.4
0		none	1990	8	15		0	250.4

Hydrograph

Hydrograph Number	Year	Month	Day	Hr	Min	Sec	Stage(ft)	Discharge (cfs)

Supporting Files